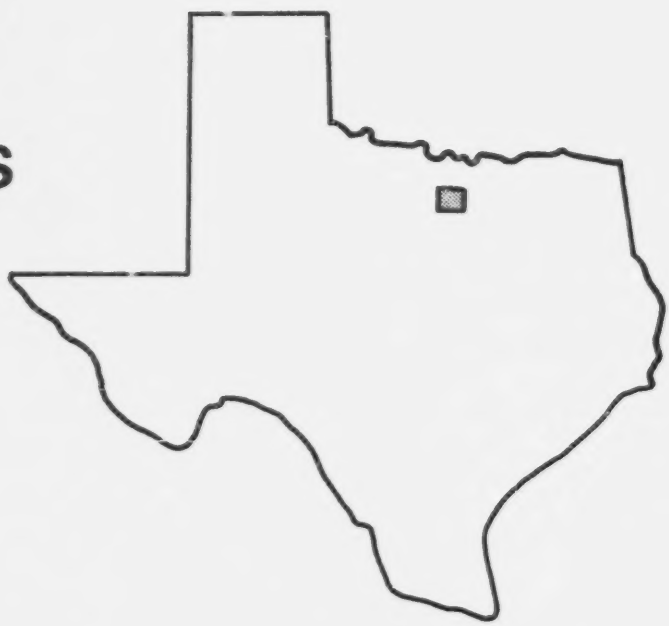
FLOOD INSURANCE STUDY

WISE COUNTY, TEXAS AND INCORPORATED AREAS



COMMUNITY NAME	COMMUNITY NUMBER
AURORA, CITY OF	481561
BOYD, CITY OF	480676
BRIDGEPORT, CITY OF	480677
CHICO, CITY OF	481053
DECATUR, CITY OF	480678
LAKE BRIDGEPORT, CITY OF	481616
NEWARK, CITY OF	481612
RUNAWAY BAY, CITY OF	481618
UNINCORPORATED AREAS	481051

MARCH 19, 1990

Federal Emergency Management Agency

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program (NFIP) have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

Part or all of this FIS may be revised and republished at any time. In addition, part of this FIS may be revised by the Letter of Map Revision (LOMR) process, which does not involve republication or redistribution of the FIS. It is, therefore, the responsibility of the user to consult with community officials and to check the community repository to obtain the most current FIS components.

Initial Countywide Flood Insurance Study Effective Date: March 19, 1990

Flood Insurance Study Revised:

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1.0 INTRODUCTION

1.1 Purpose of Study

This countywide-format Flood Insurance Study investigates the existence and severity of flood hazards in the geographic area of Wise County, Texas, including the Town of Alvord; the Cities of Aurora, Boyd, Bridgeport, Chico, Decatur, Fairview, Lake Bridgeport, Newark, Rhome, and Runaway Bay; and the unincorporated areas of Wise County (hereinafter collectively referred to as Wise County), and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgements

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were prepared by the Fort Worth District of the U. S. Army Corps of Engineers (COE) for the Federal Emergency Management Agency (FEMA), under Inter-Agency Agreement No. EMW-86-E-2226, Project Order No. 17. This work was completed in December 1987.

1.3 Coordination

On December 9, 1985, an initial Consultation and Coordination Officer's (CCO) meeting was held with representatives of FEMA, the Soil Conservation Service (SCS-Decatur), the county, and the COE (the study contractor) to determine the streams to be studied by detailed methods.

The following agencies, communities, businesses, and/or persons were contacted for information and/or coordination of results: Wise County, U. S. Geological Survey (USGS), the U. S. Coast and Geodetic Survey (USC&GS), the Bureau of Reclamation, the Texas Department of Highways and Public Transportation, Dewberry & Davis, the Texas Department of Water Resources, the SCS, and Greenhorne and O'Mara, Inc.

On March 9, 1989, a final CCO meeting was held with representatives of FEMA, the county, and the study contractor to review the results of the study.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the geographic area of Wise County, Texas. The area of study is shown on the Vicinity Map (Figure 1).

The following flooding sources were studied by detailed methods: Moss Branch, from a point approximately 550 feet downstream of the Tarrant County boundary to a point approximately 1,250 feet downstream of U. S. Routes 81 and 287; Derrett Creek, from a point southwest of the corporate limits of the City of Newark to a point approximately 0.5 mile downstream of U. S. Routes 81 and 287; Walnut Creek, from a point approximately 875 feet downstream of State Route 730 to a point approximately 1.9 miles downstream of U. S. Routes 81 and 287; and Eagle Mountain Lake. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction through December 1992.

The following flooding sources were studied by approximate methods: Harts Creek, Denton Creek, Catlett Creek, Sweetwater Creek, Oliver Creek, Harriet Creek, Elizabeth Creek, the West Fork Trinity River, Big Sandy Creek, Salt Creek, Garrett Creek, Rush Creek, Willow Creek, Eagle Mountain Lake, Lake Bridgeport, Cowskin Creek, Pringle Creek, Martin Branch, Waggoner Branch, Rosebud Branch, Dry Creek, Watson Branch, Greathouse Branch, Black Creek, Briar Branch, Center Creek, Morris Branch, Little Walnut Creek, Lola Creek, Twin Pond Creek, North Hickory Creek, Pecan Creek, North Pecan Creek, Whites Creek, Harris Creek, Miller Creek, Sisal Creek, Venchoner Creek, Turkey Creek, Hog Branch, Walker Creek, Gonzollas Creek, Cottonwood Creek, Village Creek, Coal Bed Branch, Ramsey Creek, North Fork Rush Creek, Oates Branch, Blue Creek, Big Creek, Elm Creek, South Fork Rush Creek, Boons Creek, Jasper Creek, Long Branch, Hackberry Creek, South Fork Hackberry Creek, and portions of Moss Branch, Derrett Creek, Devils Den Hollow, an unnamed tributary to Greathouse Branch, Deep Creek, Teeter Branch, Barton Branch, Dry Branch, Pecan Branch, Dry Ford, and Walnut Creek. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and Wise County.

2.2 Community Description

Wise County is located in north-central Texas, with one-fourth of its 856 square mile area in the Grand Prairie and the remaining three-fourths in the Western Cross Timbers. It is bordered by the unincorporated areas of Denton County to the east, the unincorporated areas of Cooke County to the northeast, the

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

WISE COUNTY, TX AND INCORPORATED AREAS

APPROXIMATE SCALE

8 0 8 16 24 MILES

VICINITY MAP

unincorporated areas of Montague County to the north, the unincorporated areas of Jack County to the west, the unincorporated areas of Parker County to the south, and the unincorporated areas of Tarrant County to the southeast. The county had a population of 19,704 in 1940, 16,092 in 1950, 17,612 in 1960, 19,687 in 1970, and 28,500 in 1980 (Reference 1). The City of Decatur is the county seat. Lake Bridgeport and Eagle Mountain Lake both lie in rugged country and furnish recreational facilities for the county. Drainage within the county is toward the southeast, supplied by the Trinity River system. The soil in the Cross Timbers area of the county is sandy and heavily wooded with post oak where it has not been cleared for farming. The eastern portion of the county is rolling and grass-covered, and the average annual rainfall is sufficient for crops of grain, corn, cotton, peanuts, hay, fruits, vegetables, and cantaloupes.

The study area is located in the Geological Survey Hydrologic Unit Numbers 12030101 and 12030104. The study area watershed is in the Water Resources Council Texas-Gulf Region, Subregion 03, and the Trinity River Basin.

Climatological data available from the Denton 2SE weather station at the City of Denton are considered indicative of conditions prevailing in the region. The average annual rainfall is 29.74 inches. The average January minimum temperature is 33 degrees Fahrenheit (^{o}F), and the average July maximum temperature is 96^{o}F (Reference 2).

2.3 Principal Flood Problems

Wise County has experienced loss of several bridges as a result of erosion due to flooding along its major streams.

2.4 Flood Protection Measures

No major structural flood protection measures exist or are currently planned for Wise County. In June 1977, the county entered into the emergency program with FEMA. Wise County has attempted to regulate floodplain development by ordinance.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the county, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. A flood event of a magnitude which is expected to be equaled or exceeded once on the average during any 100-year period (recurrence interval) has been selected as having special significance for floodplain management and for flood insurance rates. This event, commonly termed the 100-year flood, has a 1 percent chance of being equaled or exceeded during any year. Although the recurrence

interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each flooding source studied in detail affecting the county.

The flood-frequency discharge values for the streams studied by detailed methods were developed using the computer program NUDALLAS (Reference 3). The watershed was divided into sub-basins, and synthetic unit and flood hydrographs were developed at selected locations. National Weather Service Technical Paper No. 40, National Oceanic and Atmospheric Administration (NOAA) Technical Memorandum NWS Hydro-35, and COE Bulletin No. EM 1110-2-1411 were used in developing the 100-year discharge (References 4, 5, and 6). Peak discharge-frequency values were computed for selected locations. Routing of the flood hydrographs through each sub-basin stream length was accomplished using a modified PULS reservoir routing. The HEC-2 backwater model provided the elevation-discharge storage relationships (Reference 7).

A summary of the drainage area-peak discharge relationships for the streams studied by detailed methods is shown in Table 1, "Summary of Discharges."

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGE (cfs) 100-YEAR
MOSS BRANCH		
Above State Route 718	2.57	4,096
DERRETT CREEK		
Above State Route 718	3.97	5,576
WALNUT CREEK		
Above State Route 730	13.44	11,370

The stillwater elevation for the 100-year flood has been determined for Eagle Mountain Lake and is summarized in Table 2, "Summary of Stillwater Elevations."

TABLE 2 - SUMMARY OF STILLWATER ELEVATIONS

FLOODING SOURCE AND LOCATION	ELEVATION (feet) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
EAGLE MOUNTAIN LAKE				
Entire shoreline	*	*	657	*

*Data not computed

3.2 Hydraulic Analyses

Analvses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Cross sections for the backwater analysis were field surveyed and were located at close intervals above and/or below bridges and culverts in order to compute the significant backwater effects of these structures. Bridge data were obtained by field measurements and by bridge plans from the Texas Department of Highways and Public Transportation.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1) and the Flood Insurance Rate Map (Exhibit 2) where applicable.

Water-surface elevations of floods of the selected recurrence intervals were computed using the COE HEC-2 step-backwater computer program (Reference 7). Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals.

Channel roughness factors (Manning's "n") used in the hydraulic computations were assigned on the basis of engineering judgment and field inspection of the streams and floodplain areas. The channel "n" value for Moss Branch was 0.065, and the overbank "n" value was 0.075; for Derrett Creek, the channel "n" values ranged from 0.060 to 0.070, and the overbank "n" values ranged from 0.075 to 0.080; and for Walnut Creek, the channel "n" values ranged from 0.060 to 0.065, and the overbank "n" values ranged from 0.070 to 0.080.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the maps; the descriptions of the marks are presented in Elevation Reference Marks (Exhibit 3).

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100-year floodplain boundaries to assist communities in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. For the streams studied in detail, the 100-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:24,000 with a contour interval of 10 feet (Reference 8).

For the streams studied by approximate methods, the 100-year floodplain boundaries were delineated using the Flood Hazard Boundary Map for the unincorporated areas of Wise County (Reference 9).

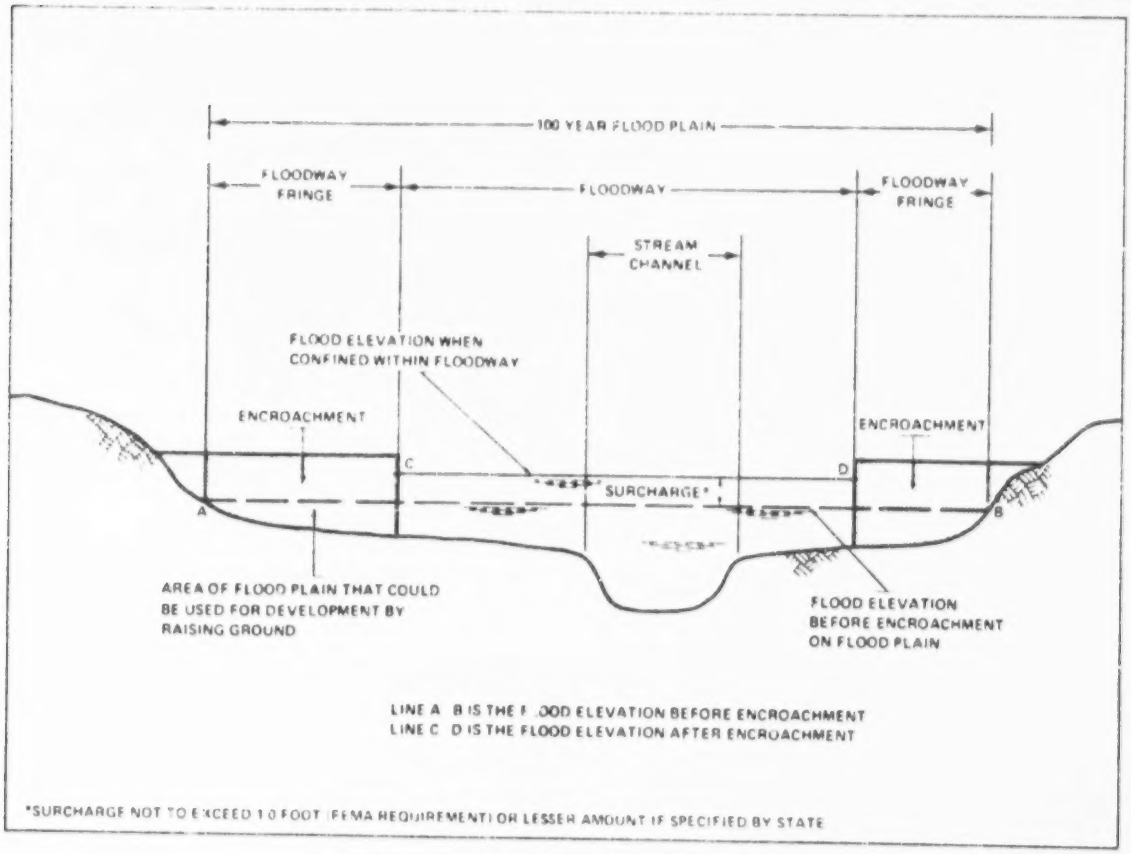
The 100-year floodplain boundaries are shown on the Flood Insurance Rate Map (Exhibit 2). On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A and AE). Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as a minimum standard that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways presented in this study were computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross sections (Table 3). The computed floodways are shown on the Flood Insurance Rate Map (Exhibit 2). In cases where the floodway and 100-year floodplain boundaries are either close together or collinear, only the floodway boundary is shown.

The area between the floodway and 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 2.


100 YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE A B IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE C D IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE

FLOODWAY SCHEMATIC Figure 2

5.0 INSURANCE APPLICATIONS

For flood insurance rating purposes, flood insurance zone designations are assigned to a co mmunity based on the results of the engineering analyses. The zones are as follows:

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
MOSS BRANCH								
A	11,860[1]	249	1,223	3.4	755.3	755.3	756.2	0.9
B	17,475[1]	150	642	5.4	792.6	792.6	793.0	0.4
C	21,730[1]	248	513	4.0	810.5	810.5	811.1	0.6
D	25,550[1]	149	367	4.9	836.2	836.2	836.2	0.0
DERRETT CREEK								
A	4,260[2]	200	1,386	4.0	657.0	657.0	658.0	1.0
B	6,250[2]	350	2,069	2.7	662.1	662.1	663.0	0.9
C	8,275[2]	101	1,094	5.1	675.5	675.5	676.3	0.8
D	12,100[2]	201	1,090	5.1	695.5	695.5	696.3	0.8
E	17,200[2]	120	776	4.4	723.8	723.8	724.6	0.8
F	20,000[2]	100	526	6.1	742.0	742.0	742.2	0.2
G	24,400[2]	200	596	4.3	780.0	780.0	780.9	0.9
WALNUT CREEK								
A	8,250[3]	551	5,553	2.0	709.9	709.9	710.9	1.0
B	12,150[3]	400	2,595	3.5	720.5	720.5	721.2	0.7
C	15,600[3]	150	1,716	5.4	731.6	731.6	732.5	0.9
D	20,400[3]	200	1,450	6.3	748.3	748.3	749.2	0.9
E	25,000[3]	199	1,676	4.9	765.6	765.6	766.4	0.8
F	28,750[3]	130	1,118	7.3	778.9	778.9	779.5	0.6
G	32,000[3]	130	1,236	6.6	794.2	794.2	795.0	0.8
H	35,850[3]	60	509	7.0	810.5	810.5	810.8	0.3
I	41,800[3]	52	405	8.8	857.6	857.6	857.6	0.0

[1]Feet above confluence with Indian Creek
[2]Feet above confluence with Eagle Mountain Lake
[3]Feet above confluence with West Fork Trinity River

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

WISE COUNTY, TX AND INCORPORATED AREAS

FLOODWAY DATA

MOSS BRANCH - DERRETT CREEK AND WALNUT CREEK

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. In most instances, whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-depths derived from the detailed hydraulic analyses are shown within this zone.

Zone A99

Zone A99 is the flood insurance rate zone that corresponds to areas of the 100-year floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or depths are shown within this zone.

Zone V

Zone V is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no base flood elevations are shown within this zone.

Zone VE

Zone VE is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 500-year floodplain, areas within the 500-year floodplain, and to areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

Zone D

Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 100-year floodplain. The locations of selected cross sections used in the hydraulic analyses are shown where applicable.

The current Flood Insurance Rate Map represents flooding information for the entire geographic area of Wise County. Previously, separate Flood Hazard Boundary Maps and/or Flood Insurance Rate Maps were prepared for each identified flood-prone incorporated community and the unincorporated areas of the county. Historical data relating to the maps prepared for each community are presented in Table 4, "Community Map History."

7.0 OTHER STUDIES

A Flood Insurance Study has been prepared for the unincorporated areas of Denton County (Reference 10). The results of this study are in complete agreement with the results of that study.

A Flood Insurance Study has been prepared for the unincorporated areas of Tarrant County (Reference 11). Discrepancies exist between this study and the study for Tarrant County because the analyses used in this study are based on more current hydrologic and hydraulic methodologies.

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
AURORA, CITY OF	JUNE 24, 1980	NONE	MARCH 19, 1990	
BOYD, CITY OF	DECEMBER 28, 1973	MARCH 5, 1976	SEPTEMBER 1, 1987	MARCH 19, 1990
BRIDGEPORT, CITY OF	JUNE 14, 1974	APRIL 23, 1976	AUGUST 1, 1987	MARCH 19, 1990
CHICO, CITY OF	AUGUST 13, 1976	NONE	SEPTEMBER 1, 1987	MARCH 19, 1990
DECATUR, CITY OF	FEBRUARY 15, 1974	APRIL 30, 1976	AUGUST 16, 1977	MARCH 19, 1990
LAKE BRIDGEPORT, CITY OF	JUNE 7, 1977	NONE	MARCH 19, 1990	
NEWARK, CITY OF	MARCH 19, 1990	NONE	MARCH 19, 1990	
RUNAWAY BAY, CITY OF	JUNE 7, 1977	NONE	MARCH 19, 1990	
UNINCORPORATED AREAS	JUNE 7, 1977	NONE	MARCH 19, 1990	

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

WISE COUNTY, TX

AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

Because it is based on more detailed and up-to-date analyses, this study supersedes the Flood Hazard Boundary Maps for the unincorporated areas of Wise County, and the Cities of Aurora, Lake Bridgeport, and Runaway Bay (References 9, 12, 13 and 14); and the previously printed Flood Insurance Studies for the Cities of Boyd, Bridgeport, Chico, and Decatur (References 15, 16, 17 and 18).

8.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting FEMA, the Natural and Technological Hazards Division, Federal Regional Center, 800 North Loop 288, Denton, Texas 76201-3698.

9.0 BIBLIOGRAPHY AND REFERENCES

1. Texas State Historical Association, The Handbook of Texas, 1952.

2. Dallas Morning News, The 1986-1987 Texas Almanac (Sesquicentennial Edition).

3. U. S. Army Corps of Engineers, Fort Worth District, Computer Program NUDALLAS, Fort Worth, Texas, revised September 1982.

4. U. S. Department of Commerce, Weather Bureau, Technical Paper No. 40, Rainfall Frequency Atlas of the United States, Washington, D. C., 1961, Revised 1963.

5. U. S. Department of Commerce, National Oceanic and Atmospheric Association, National Weather Service, Technical Memorandum NWS Hydro-35, Five to Sixty Minute Precipitation Frequency for the Eastern and Central United States, Asheville, North Carolina, National Climatic Center, June 1977.

6. U. S. Army Corps of Engineers, Civil Engineer Bulletin No. EM 1110-2-1411, Standard Project Flood Determinations.

7. U. S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water Surface Profiles, Generalized Computer Program, Davis, California, April 1984.

8. U. S. Department of the Interior, Geological Survey, 7.5-Minute Series Topographic Maps, Scale 1:24,000, Contour Interval 10 Feet: Avondale, Texas, 1967; Boyd, Texas, 1967; and Decatur, Texas, 1967.

9. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, Unincorporated Areas of Wise County, Texas, June 7, 1977.

10. Federal Emergency Management Agency, Flood Insurance Study, Unincorporated Areas of Denton County, Texas, Washington, D. C., May 4, 1987.

11. Federal Emergency Management Agency, Flood Insurance Study, Unincorporated Areas of Tarrant County, Texas, Washington, D. C., August 4, 1987.

12. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, City of Aurora, Wise County, Texas, June 24, 1980.

13. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, City of Lake Bridgeport, Wise County, Texas, June 7, 1977.

14. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, City of Runaway Bay, Wise County, Texas, June 7, 1977.

15. Federal Emergency Management Agency, Flood Insurance Study, City of Boyd, Wise County, Texas, Washington, D. C., September 1, 1987.

16. Federal Emergency Management Agency, Flood Insurance Study, City of Bridgeport, Wise County, Texas, Washington, D. C., August 1, 1987.

17. Federal Emergency Management Agency, Flood Insurance Study, City of Chico, Wise County, Texas, Washington, D. C., September 1, 1987.

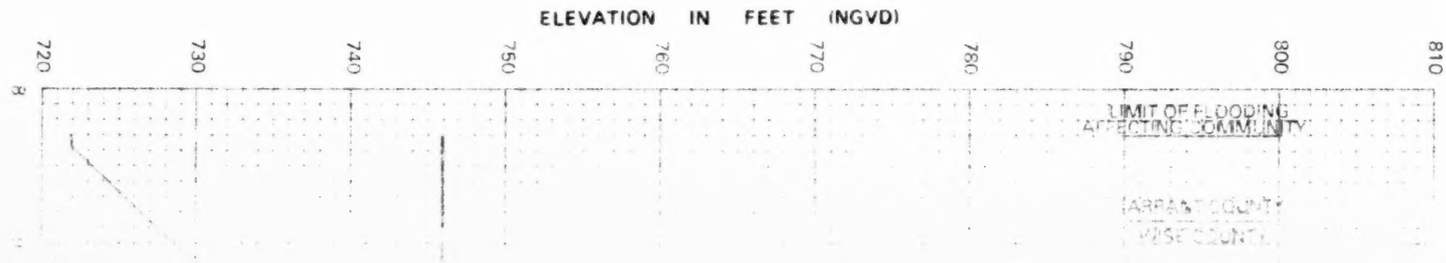
18. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, City of Decatur, Wise County, Texas, Washington, D. C., August 16, 1977.

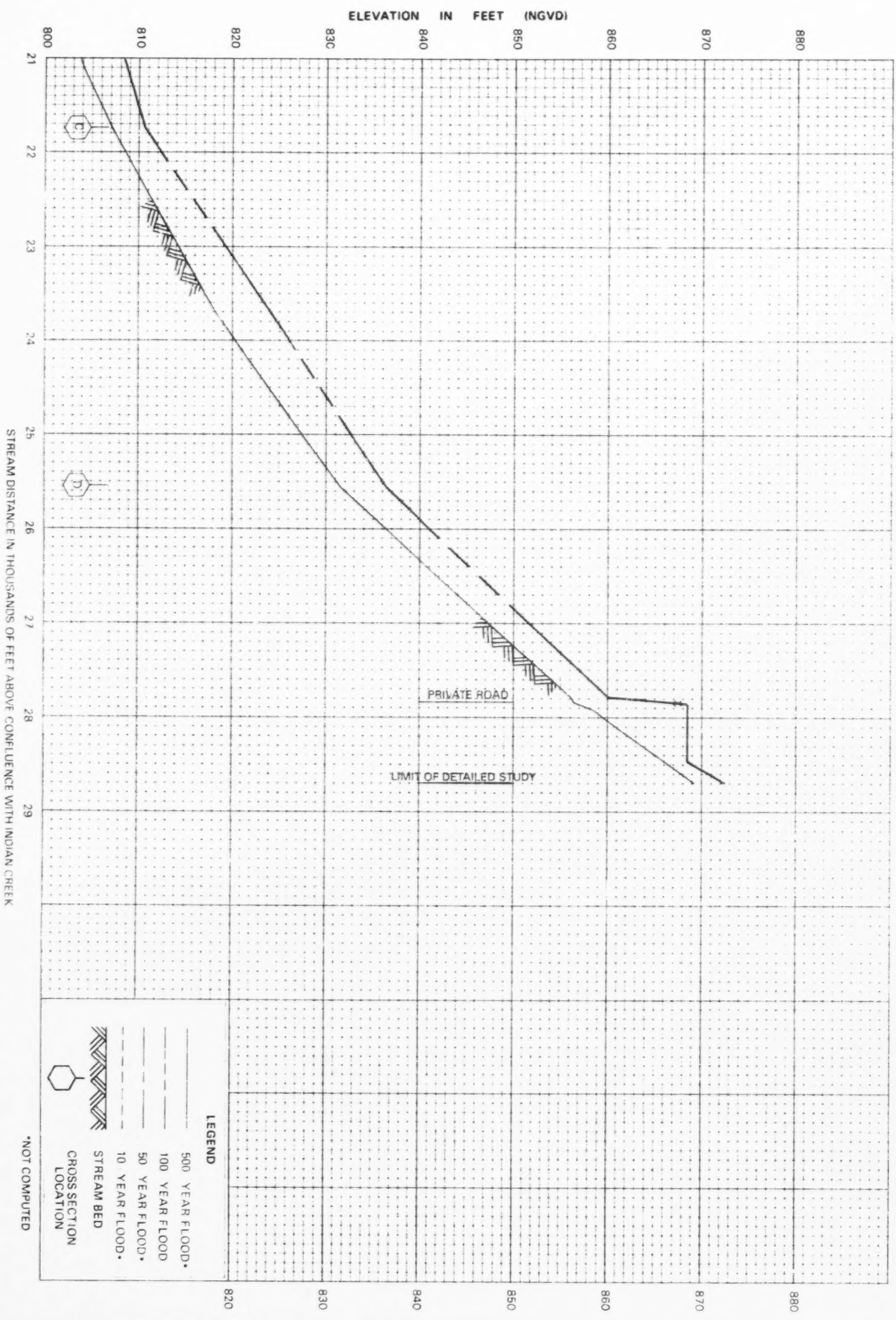
EXHIBIT 3 - ELEVATION REFERENCE MARKS

Reference Mark	FIRM Panel	Elevation (Feet NGVD)	Description of Location
RM 1	185	889.70	Railroad spike set in southwest side of power pole on east side of State Route 730 located approximately 2.5 miles to south along State Route 730 from Wise County Farm Bureau office in Decatur.
RM 2	185	806.39	Cut square in I-beam bridge joist at southwest corner of gravel road bridge over Walnut Creek, approximately 2 feet lower than bridge deck; located approximately 6.85 miles north along State Route 730 from intersection of State Route 114 and State Route 730.
RM 3	185	780.54	Cut square on top of 8-inch capped pipe bridge support post on east end of bridge over Walnut Creek on north side of county road.
RM 4	195	730.54	Cut square on top of 8-inch capped pipe on east end of bridge over Walnut Creek.
RM 5	195	707.36	Chiseled square on top of west end of north concrete guardrail of State Route 730 bridge over Walnut Creek.
RM 6	280	766.39	Cut square on top of 78-inch reinforced concrete pipe culvert on east side of New Rhome Highway.
RM 7	280	784.27	Chiseled square on top of north culvert pipe on east side of New Rhome Highway.
RM 8	280	681.81	Chiseled square on centerline of concrete bridge rail footing on north side of State Route 718 bridge over Derrett Creek.
RM 9	280	867.82	Chiseled square in top of concrete headwall over 24-inch tin culvert pipe outlet for pond, on north side of private drive to Vinson Ranch main house.
RM 10	280	805.26	Railroad spike in forks of 14-inch hackberry tree on north side of Ramhorn Hill Road, approximately 1.0 mile from intersection of U. S. Highway 81 and 287 and Ramhorn Hill Road, approximately 300 feet east of Moss Branch.

EXHIBIT 3 - ELEVATION REFERENCE MARKS (continued)

Reference Mark	FIRM Panel	Elevation (Feet NGVD)	Description of Location
RM 11	290	855.28	Cut square on corner of 12-inch I-beam bridge joist on south of bridge over Derrett Creek on Rogers Road. Approximately 150 feet northwest of Newark Sewage Treatment Plant.
RM 12	290	750.57	Former location of brass disk, approximately 1.5 miles east of Newark, on east side of south headwall of culvert across old road bed, approximately 250 feet south of intersection of State Route 718 and main entrance road to Eagle Mountain National Guard Base.


ELEVATION IN FEET (NGVD)
720
730
740
750
760
770
780
790
800
810
LIMIT OF FLOODING AFFECTING COMMUNITY



02P

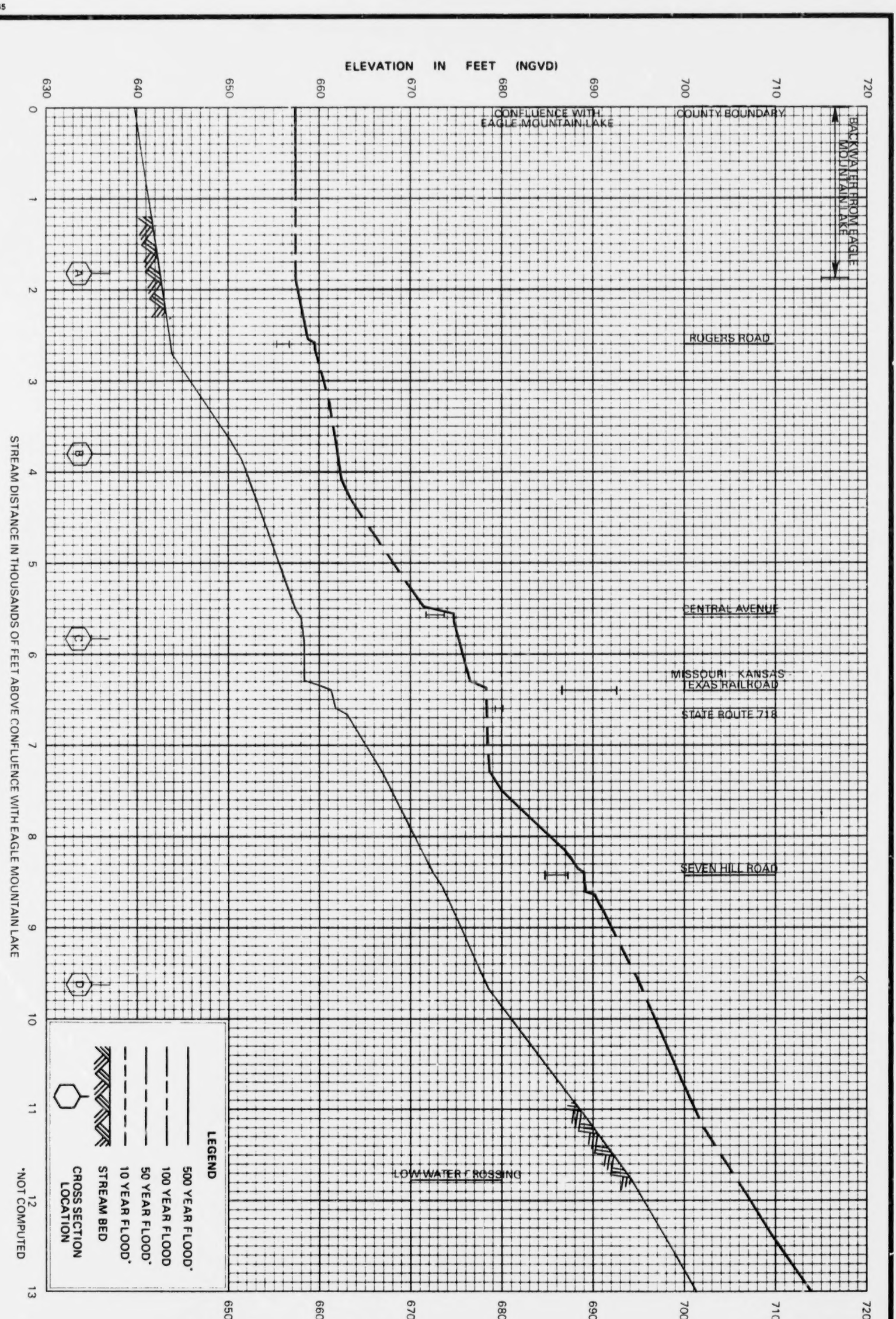
FEDERAL EMERGENCY MANAGEMENT AGENCY

WISE COUNTY, TX
AND INCORPORATED AREAS

FLOOD PROFILES

MOSS BRANCH

135365



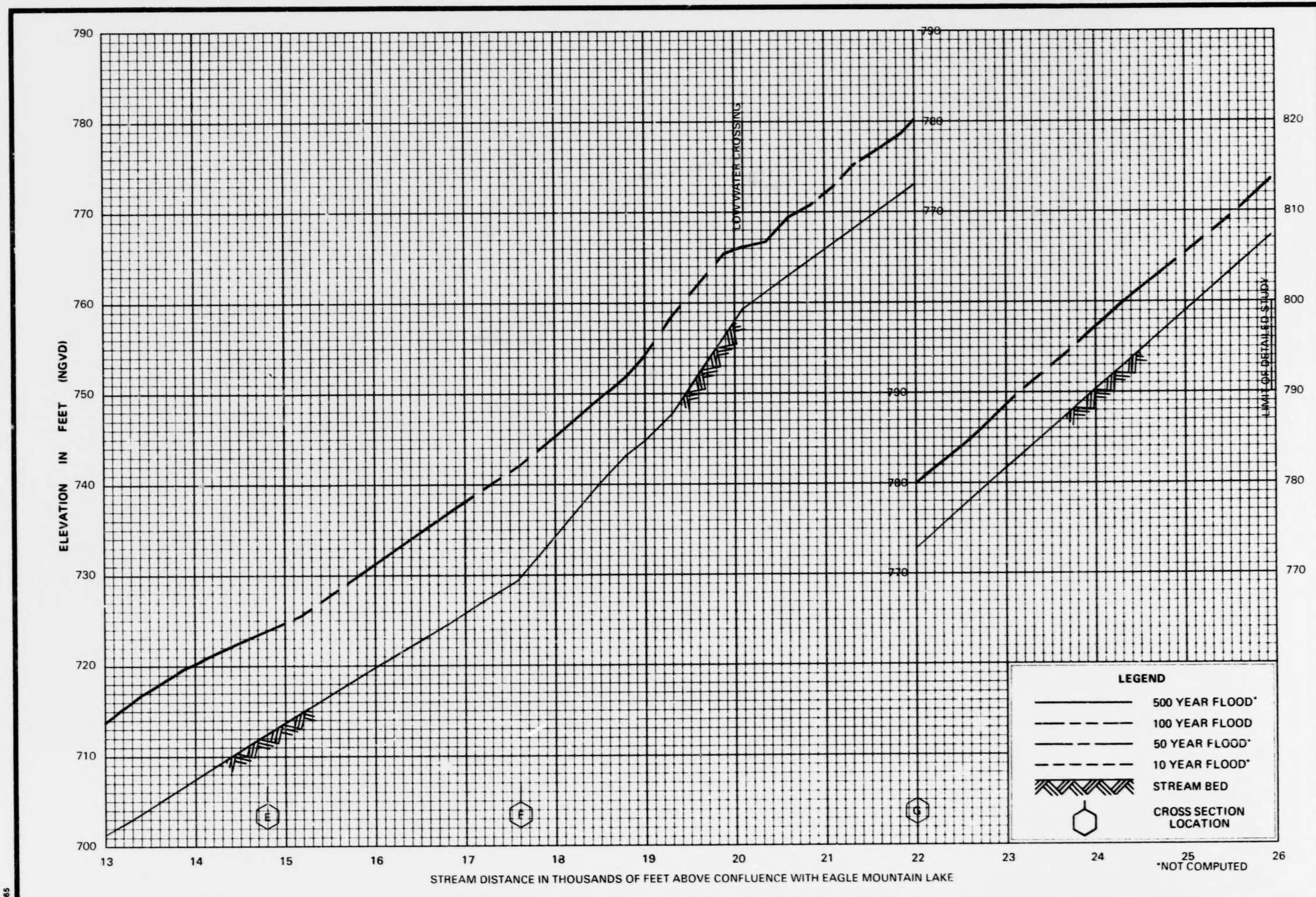
FEDERAL EMERGENCY MANAGEMENT AGENCY

WISE COUNTY, TX
AND INCORPORATED AREAS

FLOOD PROFILES

DERRETT CREEK

03P



FLOOD PROFILES

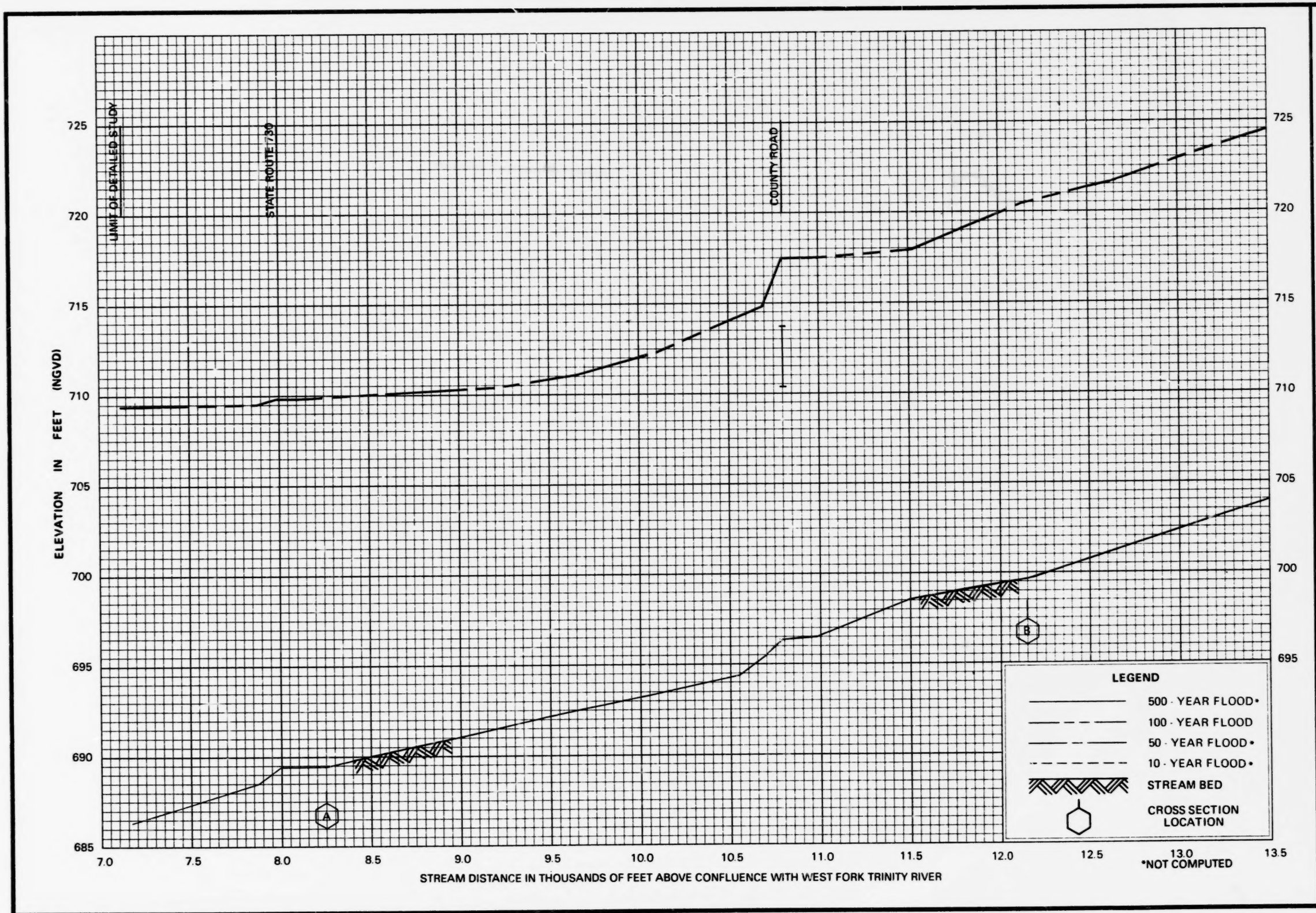
DERRETT CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WISE COUNTY, TX
AND INCORPORATED AREAS

04P

135365



FLOOD PROFILES

WALNUT CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WISE COUNTY, TX
AND INCORPORATED AREAS

05P

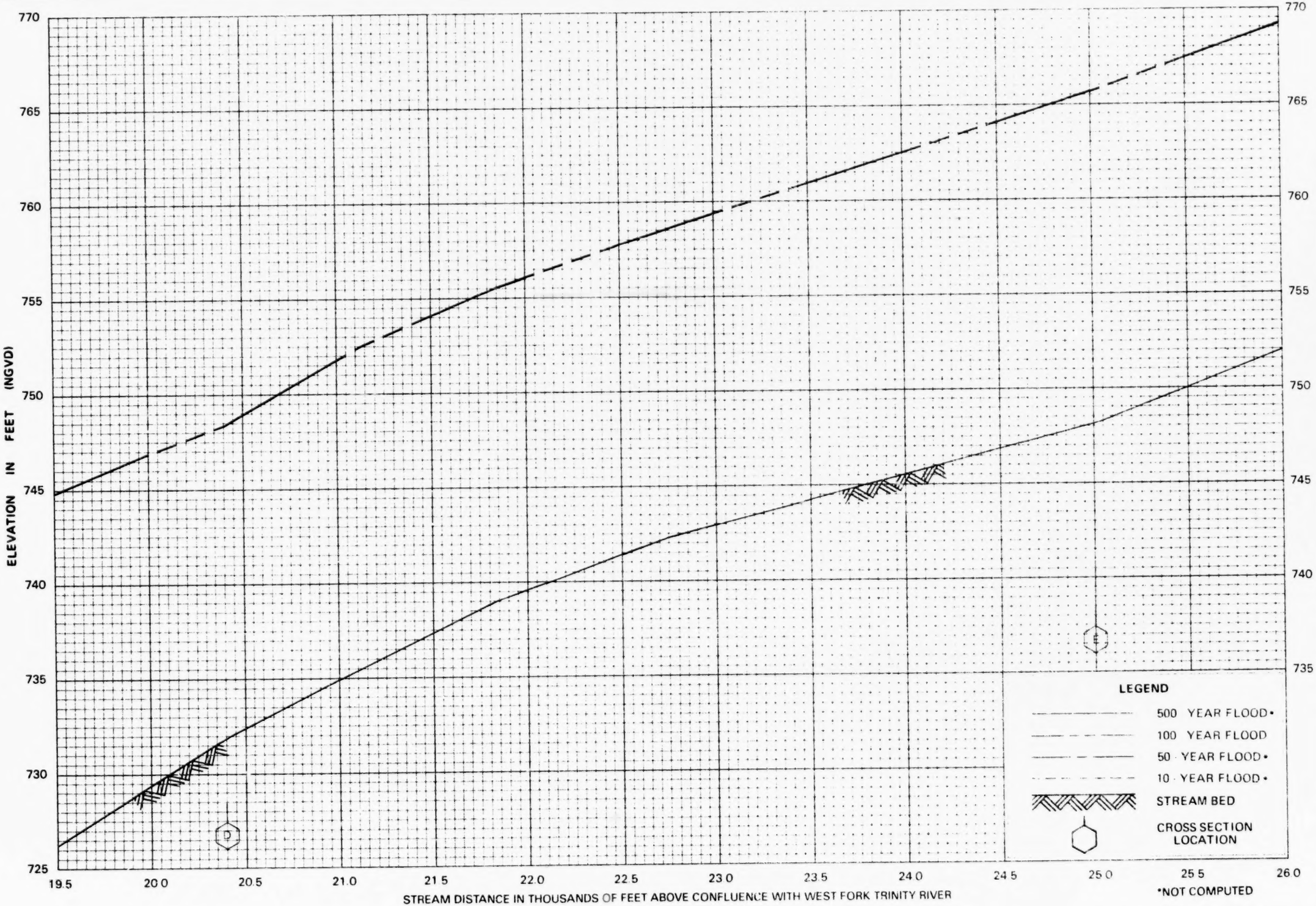
FLOOD PROFILES

WALNUT CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WISE COUNTY, TX AND INCORPORATED AREAS

06P



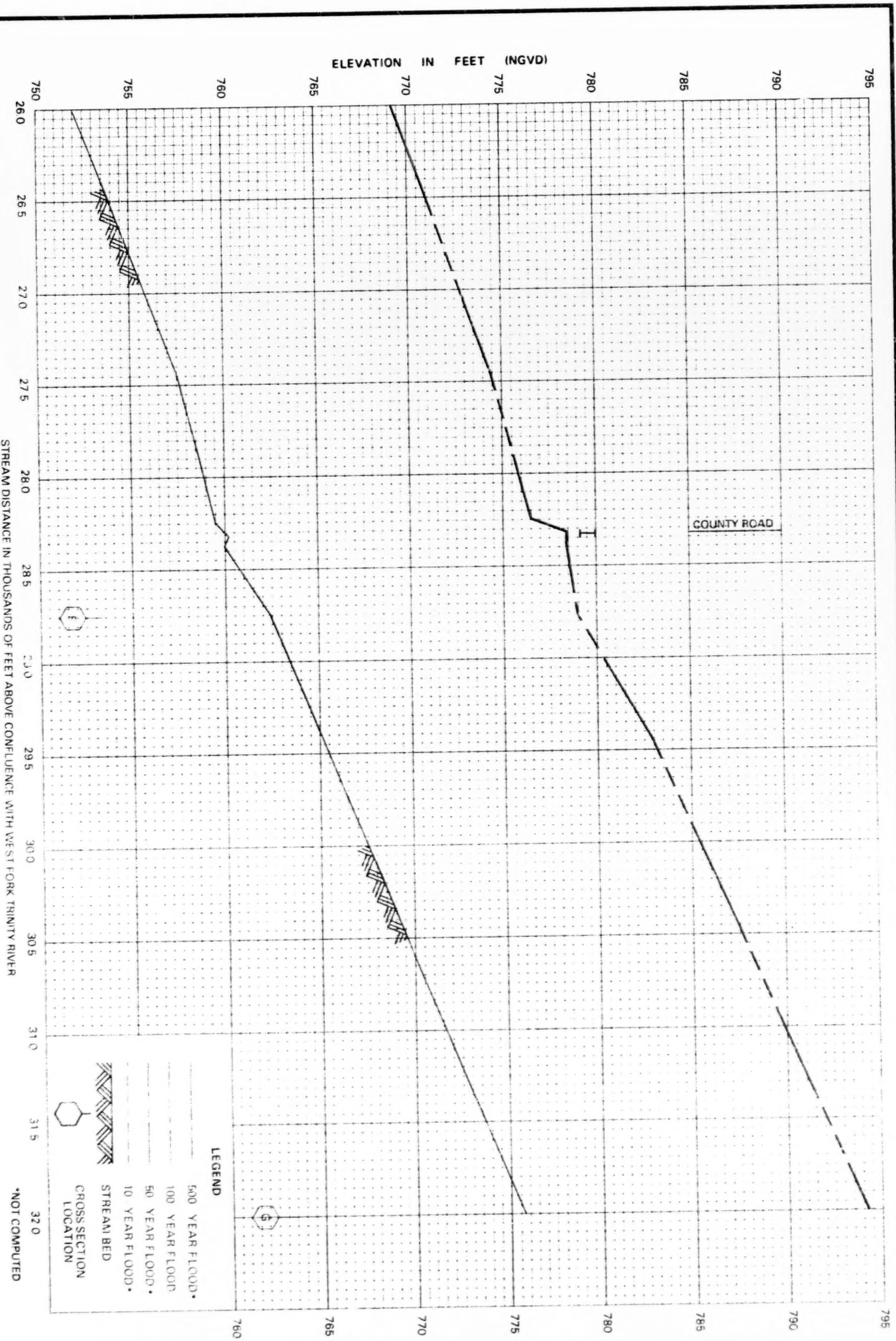
FLOOD PROFILES

WALNUT CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WISE COUNTY, TX
AND INCORPORATED AREAS

07P



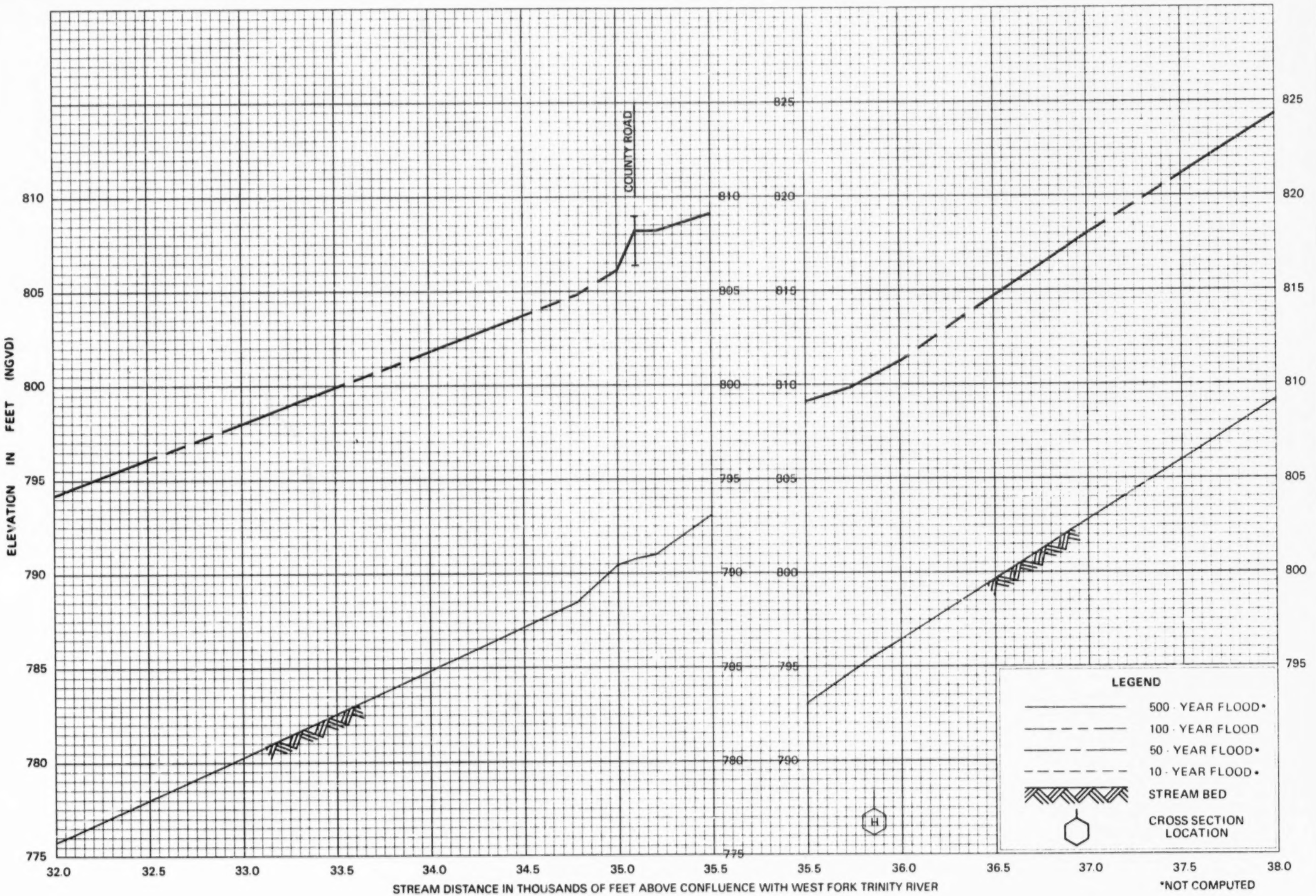
08P

FEDERAL EMERGENCY MANAGEMENT AGENCY

WISE COUNTY, TX
AND INCORPORATED AREAS

FLOOD PROFILES

WALNUT CREEK



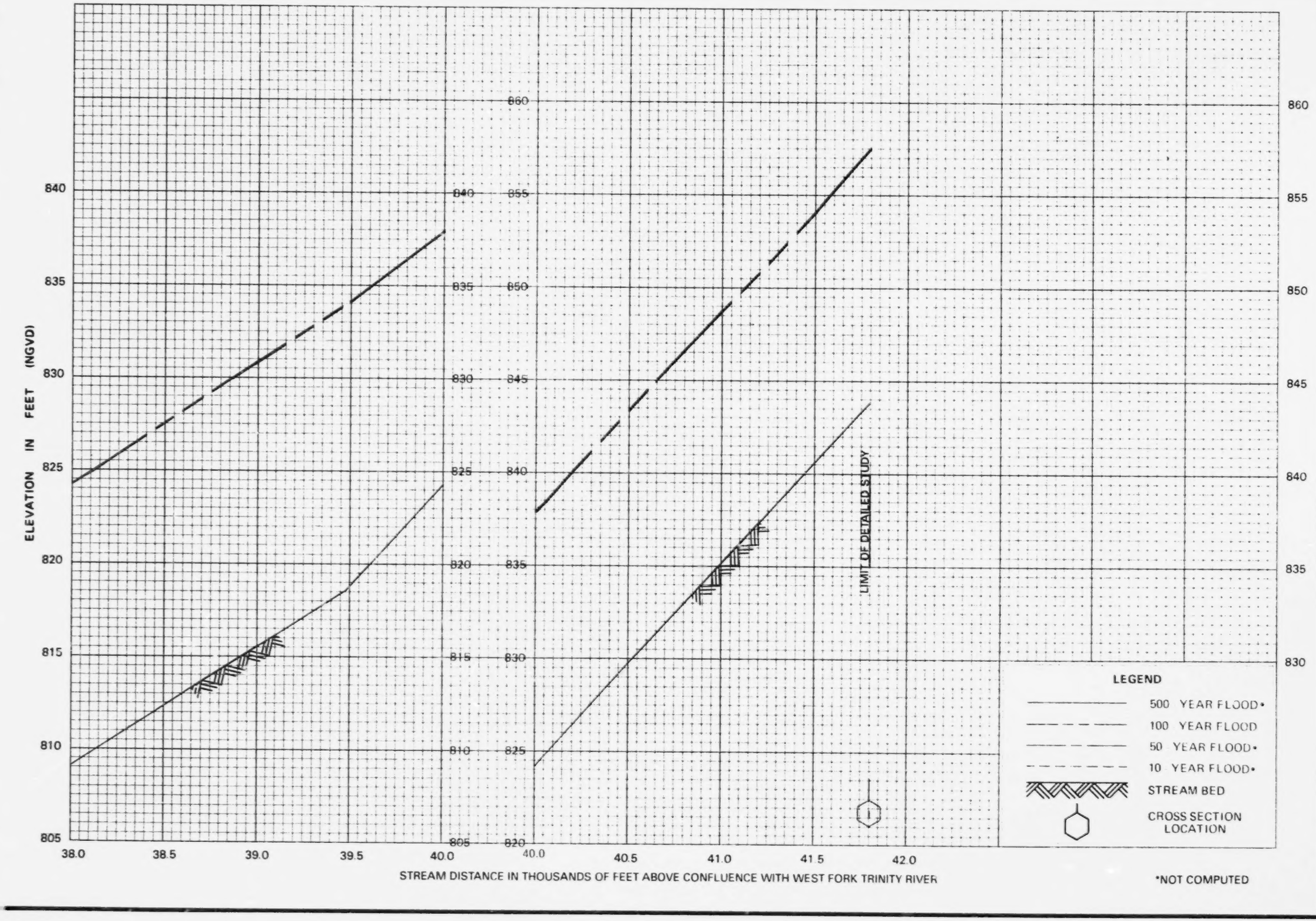
FLOOD PROFILES

WALNUT CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WISE COUNTY, TX
AND INCORPORATED AREAS

09P



FLOOD PROFILES

WALNUT CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WISE COUNTY, TX
AND INCORPORATED AREAS